

## **Nondestructive Determination of Accelerated Aging of Composite Materials\***

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### **ABSTRACT**

The durability of many advanced composite materials is not known. Lawrence Livermore National Laboratory has assembled an extensive capability to quickly age composite materials to determine their durability limits. Part of this capability is nondestructive evaluation techniques to sense and quantify aging damage. Ultrasonic and computed tomography methods have demonstrated the ability to either image substantial damage such as delaminations or; more importantly, quantify the amount of aging damage when no obvious damage has occurred. Computed tomography images cracks and inclusions in the composite thus detecting gross damage. Ultrasonic velocity and attenuation measurements have been correlated with aging damage before major defects appear. Ultrasonic attenuation at specific frequencies has been correlated with aging in composites caused by elevated temperature at specific time intervals. The ultrasonic techniques have been applied for bulk material aging and surface damage.

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